What is claimed is:

1.     A method for processing digital images received in the form of compressed video streams comprising the step of (a) determining a region intensity histogram (RIH) based on information on motion compensation of inter frames.

2.     The digital video processing method according to claim 1, before the step (a), further comprising the steps of:

(p-a) receiving video streams;

(p-b) grouping the video streams into a plurality of groups using a predetermined algorithm;

(p-c) selecting a group to be processed,

wherein in the step (a), the RIH of the selected group is determined based on information on motion compensation of inter frames.

3.     A method for processing digital images received in the form of compressed video streams comprising the step of:

(a) selecting an inter frame from the video streams;

(b) with respect to the selected inter frame, calculating the ratio of the number of blocks whose motion compensation values are zero to the total number of macroblocks;

(c) quantizing the ratio into $i$ levels, where $i$ is a predetermined positive number;

(d) checking whether the processed inter frame is the last one;

(e) if it is determined in the step (d) that the processed inter frame is not the last one, selecting the next inter frame and performing the steps (b) through (d);

(f) if it is determined in the step (d) that the processed inter frame is the last one, calculating the ratio of the number of inter frames in the $i$th level to the total number of inter frames in a given region; and

(g) determining the ratio obtained in the step (f) as predetermined histogram information.

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4.     The digital video processing method according to claim 3, further comprising the steps of:

(p-a) receiving video streams;

(p-b) grouping the video streams into a plurality of groups using a predetermined algorithm;

(p-c) selecting a group to be processed,

wherein in the step (a), an inter frame is selected from the video stream group selected in the step (p-c).


5.     The digital video processing method according to claim 4, after the step (g), further comprising the steps of:

(h) checking whether the selected group is the last one;

(i) if it is determined in the step (h) that the selected group is not the last one, selecting the next group; and

(j) performing the steps (a) through (h) with respect to the next group selected in the step (i).


6.     The digital video processing method according to claim 4, wherein the predetermined algorithm is a scene cut detection algorithm.


7.     The digital video processing method according to claim 5, wherein the predetermined algorithm is a scene cut detection algorithm.


8.     The digital video processing method according to claim 4, wherein the video streams are moving picture expert group (MPEG)-7 video streams.


9.     The digital video processing method according to claim 5, wherein the video streams are moving picture expert group (MPEG)-7 video streams.


10.    The digital video processing method according to claim 6, wherein the video streams are moving picture expert group (MPEG)-7 video streams.

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11. The digital video processing method according to claim 7, wherein the video streams are moving picture expert group (MPEG)-7 video streams.

12. The digital video processing method according to claim 3, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

13. The digital video processing method according to claim 4, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

14. The digital video processing method according to claim 5, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

15. The digital video processing method according to claim 6, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

16. The digital video processing method according to claim 7, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

17. The digital video processing method according to claim 8, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

18. The digital video processing method according to claim 9, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

19. The digital video processing method according to claim 10, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

20. The digital video processing method according to claim 11, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

21. A digital video processing method comprising the step of defining the distribution of blocks whose motion compensation values are zero as motion activity, with respect to inter frames.

22. A computer readable medium having program codes executable by a computer to perform a digital video processing method comprising the steps of:

(a) selecting an inter frame from the video streams;

(b) with respect to the selected inter frame, calculating the ratio of the number of blocks whose motion compensation values are zero to the total number of macroblocks;

(c) quantizing the ratio into $i$ levels, where $i$ is a predetermined positive number;

(d) checking whether the processed inter frame is the last one;

(e) if it is determined in the step (d) that the processed inter frame is not the last one, selecting the next inter frame and performing the steps (b) through (d);

(f) if it is determined in the step (d) that the processed inter frame is the last one, calculating the ratio of the number of inter frames in the ith level to the total number of inter frames in a given region; and

(g) determining the ratio obtained in the step (f) as predetermined histogram information.

23. The computer readable medium according to claim 22, wherein the digital video processing method further comprises:

(p-a) receiving video streams;

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4     (p-b) grouping the video streams into a plurality of groups using a

5 predetermined algorithm; and

6     (p-c) selecting a group to be processed, and wherein in the step (a), an inter

7 frame is selected from the video stream group selected in the step (p-c).


1     24.    The computer readable medium according to claim 23, wherein after

2 the step (g), the digital video processing method further comprises the steps of:

3     (h) checking whether the selected group is the last one;

4     (i) if it is determined in the step (h) that the selected group is not the last one,

5 selecting the next group; and

6     (j) performing the steps (a) through (h) with respect to the next group selected

7 in the step (i).


1     25.    The computer readable medium according to claim 23, wherein the

2 predetermined algorithm is a scene cut detection algorithm.


1     26.    The computer readable medium according to claim 24, wherein the

2 predetermined algorithm is a scene cut detection algorithm.


1     27.    The computer readable medium according to claim 22, wherein the

2 video streams are MPEG-2 video streams.


1     28.    The computer readable medium according to claim 23, wherein the

2 video streams are MPEG-2 video streams.


1     29.    The computer readable medium according to claim 24, wherein the

2 video streams are MPEG-2 video streams.


1     30.    The computer readable medium according to claim 25, wherein the

2 video streams are MPEG-2 video streams.

31. The computer readable medium according to claim 26, wherein the video streams are MPEG-2 video streams.

32. The computer readable medium according to claim 22, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

33. A digital video processing apparatus comprising:

grouping means for grouping video streams using a predetermined algorithm, selecting a group to be processed, and selecting and outputting each inter frame from the selected group in sequence;

ratio calculating means for calculating the ratio of the number of blocks whose motion compensation values are zero to the total number of macroblocks, with respect to the selected inter frame;

quantizing means for quantizing the ratio into $i$ levels, where $i$ is a predetermined positive number, and outputting level indication signals which indicate the respective levels; and

region intensity histogram (RIH) calculating means for calculating the ratio of the number of inter frames in the $i$th level to the total number of inter frames in a region, and outputting the calculation result as RIH information.

34. The digital video processing apparatus according to claim 33, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

35. The digital video processing apparatus according to claim 33, further comprising RIH information storage means for receiving the RIH information and storing the same.

36. The digital video processing apparatus according to claim 34, further comprising RIH information storage means for receiving the RIH information and storing the same.

37.    The digital video processing apparatus according to claims 35, wherein the RIH information storage means receives video stream data, interleaves the RIH information into the video stream data and outputs RIH information interleaved video streams.

38.    The digital video processing apparatus according to claims 36, wherein the RIH information storage means receives video stream data, interleaves the RIH information into the video stream data and outputs RIH information interleaved video streams.

39.    A digital video analyzing method comprising the step of calculating the difference between $RIH_1$ and $RIH_2$, which is denoted by Distance $(RIH_1, RIH_2)$, as represented by the following Expression:

$$Dis\tan ce(RIH_1, RIH_2) = (RIH_1 - RIH_2)^T M^{-1}(RIH_1, RIH_2)$$

wherein, of two video streams in a given video scene, RIH information of the first video stream is $RIH_1$, RIH information of the second video stream is $RIH_2$, and M is a covariance matrix.

40.    The digital video analyzing method according to claim 39, further comprising the step of determining the calculated difference by the difference in intensity between two video streams.

41.    A method for searching for a desired digital video scene in compressed video streams comprising the step of:
       (a) receiving video streams;
       (b) grouping the video streams into a plurality of groups using a predetermined algorithm;
       (c) selecting a group to be processed;
       (d) determining a region intensity histogram (RIH) of the selected group based on information on motion compensation of inter frames in the selected group;

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9      (e) selecting a video scene to be searched;

10     (f) retrieving RIH information of the selected video scene; and

11     (g) searching regions having similar RIH information based on the retrieved

12     RIH information, in each of the processed video streams.


1      42.    An apparatus for searching for a desired digital video scene in

2      compressed video streams comprising:

3      grouping means for grouping input video streams into a plurality of groups

4      using a predetermined algorithm;

5      motion compensation information retrieving means for retrieving information

6      on motion compensation of inter frames from a selected group and outputting

7      processed video streams including the information as the RIH information of the

8      selected group; and

9      searching means for retrieving RIH information of a selected group to be

10     searched and searching for regions having similar RIH information based on the

11     retrieved RIH information.


1      43.    A digital video processing apparatus comprising:

2      a grouping unit for grouping video streams using a predetermined algorithm,

3      selecting a group to be processed, and selecting and outputting each inter frame

4      from the selected group in sequence;

5      a ratio calculating unit for calculating the ratio of the number of blocks whose

6      motion compensation values are zero to the total number of macroblocks, with

7      respect to the selected inter frame;

8      a quantizing unit for quantizing the ratio into $i$ levels, where $i$ is a

9      predetermined positive number, and outputting level indication signals which indicate

10     the respective levels; and

11     a region intensity histogram (RIH) calculating unit for calculating the ratio of

12     the number of inter frames in the ith level to the total number of inter frames in a

13     region, and outputting the calculation result as RIH information.


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44.     The digital video processing apparatus according to claim 43, wherein the predetermined histogram information is defined by a region intensity histogram (RIH) which indicates the intensity of a given video scene region.

45.     The digital video processing apparatus according to claim 43, further comprising a region intensity histogram (RIH) information storage unit for receiving the RIH information and storing the same.

46.     The digital video processing apparatus according to claim 44, further comprising a region intensity histogram (RIH) information storage unit for receiving the RIH information and storing the same.

47.     The digital video processing apparatus according to claims 43, wherein the RIH information storage unit receives video stream data, interleaves the RIH information into the video stream data and outputs RIH information interleaved video streams.

48.     An apparatus for searching for a desired digital video scene in compressed video streams comprising:
        a grouping unit for grouping input video streams into a plurality of groups using a predetermined algorithm;
        a motion compensation information retrieving unit for retrieving information on motion compensation of inter frames from a selected group and outputting processed video streams including the information as the RIH information of the selected group; and
        a searching unit for retrieving RIH information of a selected group to be searched and searching for regions having similar RIH information based on the retrieved RIH information.